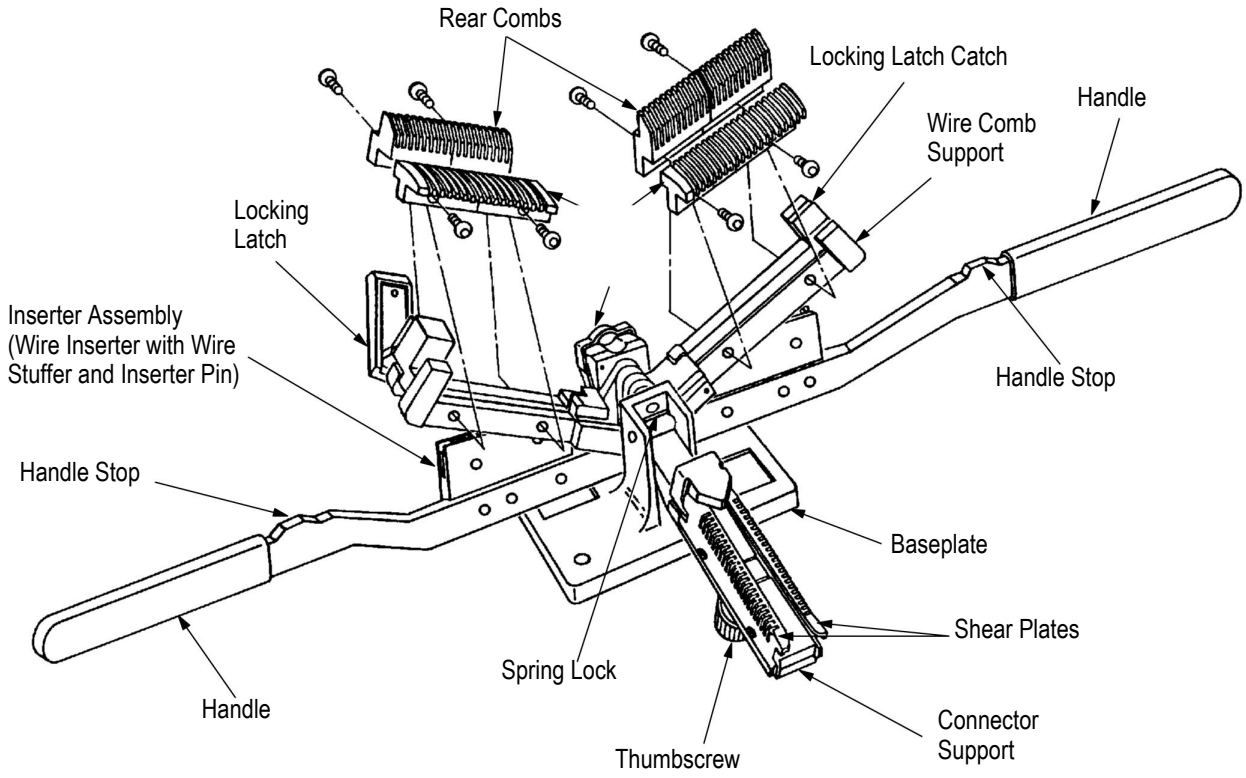
PROPER USE GUIDELINES

Cumulative Trauma Disorders can result from the prolonged use of manually powered hand tools. Hand tools are intended for occasional use and low volume applications. A wide selection of powered application equipment for extended-use, production operations is available.



Note that Tool 231880-1 is shown exploded for clarity.

Figure 1

1. INTRODUCTION

The CHAMP Portable Hand Operated Tool 231880-1 (MI-1) is designed to terminate 64-position CHAMP connectors using the displacement crimp technique. It can also terminate 14-, 24-, and 36-position CHAMP connectors without any modification or conversion. In its marketed form, tool 231880-1 is not capable of terminating 50-position CHAMP connectors. It can be converted to terminate 50-position connectors by using Inserter Assembly 229694-7; see Paragraph 10.

NOTE

All dimensions on this sheet are in millimeters [with inch equivalents in brackets]. Figures and illustrations are for identification only and are not drawn to scale.

Reasons for reissue of this sheet are provided in Section 13, REVISION SUMMARY.

2. DESCRIPTION (FIgure 1)

The MI-1 hand tool 231880-1 contains a fixed wire comb feature and will produce a 90 degree (right-angle) cable dress. The features of the hand tool are as follows:

Base Plate - Supports functional components of the tool. The base plate can be secured to the work bench.

Handles - Retain wire stuffers/inserters and provide insertion force. Stops on handles prevent over-insertion during the terminating process.

Connector Support - Holds connector in proper position and provides surface (shear plates) for cutting off excess wire.

Spring Lock - Affords positive lock when connector support is in the UP position.

Thumbscrew - Secures connector to the connector support.

Wire Combs - Consist of two rear combs and two front combs. The combs separate and hold wires that are laced into the tool.

Wire Comb Supports - Support wire combs and locking latch.

Cable Clamp - Holds cable in position on the tool during lacing procedure.

Locking Latch - Holds wire comb supports together during termination of wires.

Inserters and Wire Stuffers - Cuts and simultaneously inserts wires between contact slots.

3. POSITIONING TOOL FOR USE

Select a sturdy work bench that is a convenient height for the operator. Position the tool on the work bench: make sure there is sufficient space at the back of the tool to permit handling of the cable bundle, and **make sure tool handles can open fully.** Secure the base plate to the work bench. Make certain the work area is well illuminated, and that the area around the tool is kept clear for operation of the handles.

4. CABLE PREPARATION (FIgure 2)

The connector contacts are designed to accept No. 26-22 AWG solid conductor wires or 28-22 AWG stranded (7-strand only) conductor wires. A maximum insulation diameter of 1.14 [.045] is acceptable for soft insulation, such as pvc or polyethylene.

NOTE

The following procedure has been prepared for standard color-coded wires. The same method of operation will apply for nonstandard color-coded wires - however, the wire groups MUST be defined in some other way.

Proceed as follows:

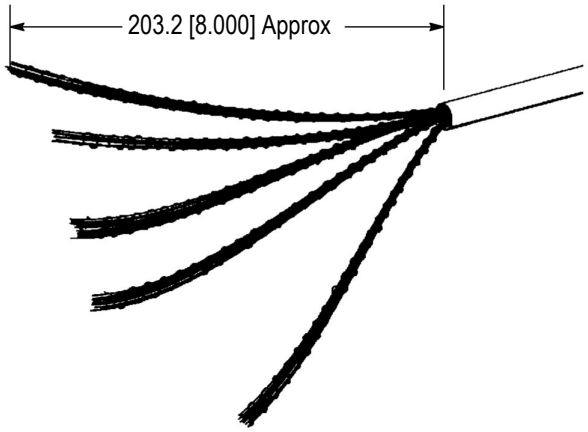
1. Remove approximately 203.20 [8.000] of sheathing from the cable end. Do NOT nick or cut the insulation of the individual wires.

NOTE

If using connector with short tapered cover, slit cable sheathing back 25.4 [1.000] - then fold sheathing back over itself before placing cable in tool.

2. Separate wires into color groups (predominantly white in one group, predominantly red in one group, etc.)

3. Wrap a piece of wire around each group to keep the groups separated



Preparation of Cable
(Five Color Groups Shown)

No standard code exists for 64-position assemblies.

WIRE		
WIRE SIZE mm² [AWG]	**CONDUCTOR TYPE**	**INSULATION DIAMETER (Max.)**
0.13-0.3 [26-22]	Solid	1.14 [.045]
0.09-0.3 [28-22]	Stranded (7 Strands)	

Figure 2

5. TERMINATING PROCEDURE

5.1. Placing Wires and Connector in Tool

1. Open tool handles fully. Push on left side of locking latch until it snaps open, then push on right side to open latch completely. Refer to Figure 1.

2. Rotate both wire comb supports outward and move connector support down. The tool is now ready to receive the connector and wires.

3. Loosen thumbscrew by rotating it COUNTERCLOCKWISE several turns.

4. Select the appropriate plug or receptacle connector size for the application. Align connector with FRONT of connector support - make sure connector is oriented properly by use of contact position numbers: LOW number positions are to the LEFT. Insert connector between shear plates and into connector support until it bottoms.

5. Turn thumbscrew CLOCKWISE until connector is securely held.

6. Open the cable clamp and position cable so that the sheathing extends at least 12.7 [.500] above the base plate. Hold cable in position and close cable clamp. See Figure 3.

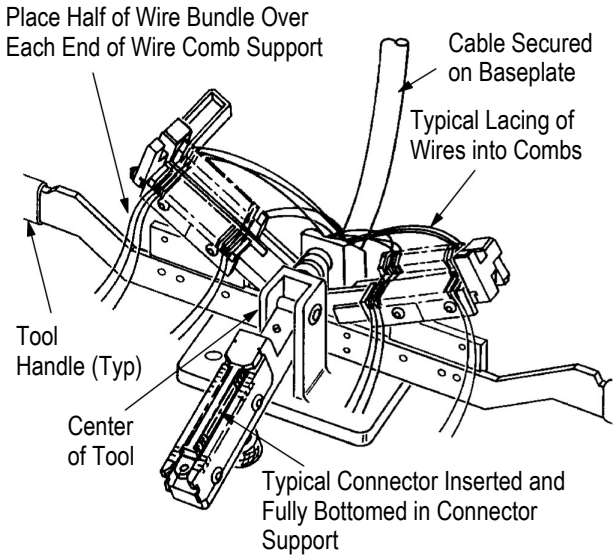


Figure 3

7. Pull first group of wires forward and remove piece of wire installed in preparing the cable (Step 3 of Paragraph 4). Separate wires by tracer and body color (ring and tip). Place ring wires to the LEFT and tip wires to the RIGHT.

8. Lace wires into combs, starting towards the center. Take wire from one side (LEFT or RIGHT) and lace wire through rear comb teeth and into corresponding position in front comb teeth. While keeping wire taut, bend wire under front comb and, when lacing on tool, around inside of wire comb supports. See Figure 3.

9. Take mating wire from opposite side of tool (lacing fixture) and lace it through combs in same manner. Visually check to make sure wires are properly laced through combs.

10. Repeat Steps 8 and 9 until half of the wire bundle is laced into the combs. After bending first half of wire bundle around inside of wire comb supports toward center of the tool), change direction and bend second half of wire bundle around outside of wire comb supports, or towards tool handles.

5.2. Tool Operation (Figure 4)

1. Check to be sure all wires are parallel in the combs. Make sure connector is bottomed in connector support.

2. Raise connector support to vertical position.

3. Be careful that the wires remain in the combs. Raise one wire comb support to a vertical position and, while holding it in place, raise other wire comb support to the vertical position.

4. Hook locking latch onto RIGHT wire comb support. Press on LEFT side of locking latch until it is secure.

5. Look into sides of both wire comb supports to check alignment of wires. Each conductor must be aligned with a single contact.

6. Raise tool handles until the stops on the handles butt against each other (these are two-handed tools, and the handle stops must bottom). This shears all wire ends and fully inserts all wires.

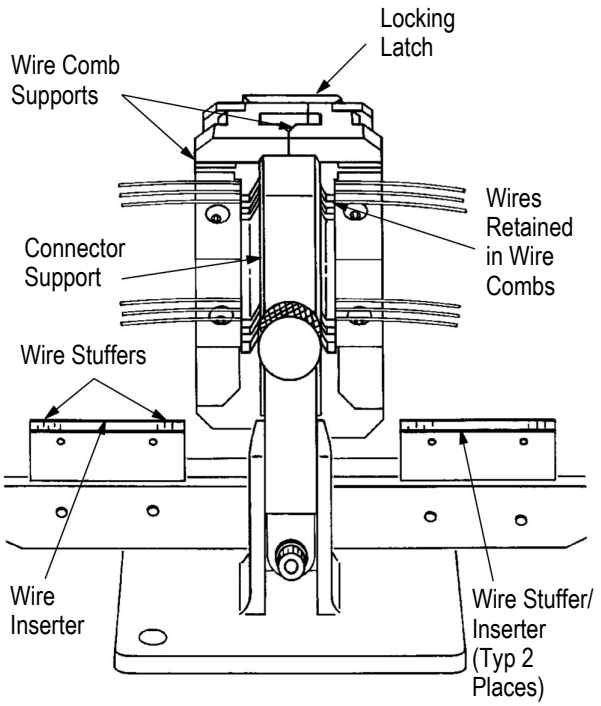
7. Remove sheared wire ends from combs. Lower the tool handles.

8. Loosen thumbscrew by turning it COUNTERCLOCKWISE.

9. Open locking latch and rotate wire comb supports downward.

10. Open cable clamp. Slide terminated connector straight out of connector support.

11. Inspect all terminations as described in Paragraph 6.



Typical Tool Closed and Ready to Terminate in Connector.

Figure 4

6. INSPECTION OF TERMINATIONS

Visually inspect the wire terminations in the connector for the following:

1. Make certain wire is inserted evenly so that the insulation is below the “V” shaped lead-in on both the contact slot and the strain relief slot. See Figure 5.

Inspection Features

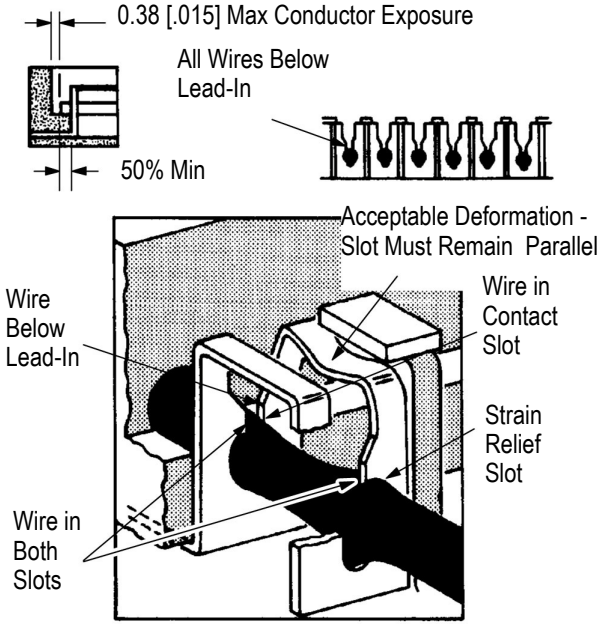


Figure 5

2. Check that all wires have been sheared (if applicable) to the proper length (extends at least 50% of the distance between the contact slot and the housing), and not more than 0.38 [.015] maximum conductor exposure.

3. Check that the insulation is NOT cut in any area other than the slot insertion area.

4. Check to be sure the contacts are NOT deformed or crushed.

5. Make certain the conductors have NOT been cut above the strain relief slot in the contacts.

NOTE

If any of the wires are NOT properly terminated, re-insert them using the T-Handle Insertion Tool 229384-1. Instruction Sheet 408-7558 for use with the tool is packaged with the tool.

7. TOOL INSPECTION

CHAMP MI-1 Hand Tool 231880-1 should be inspected with the information provided in Figure 6. It is recommended that the tool be inspected immediately upon its arrival at your facility, and at regularly scheduled intervals, to ensure that the tool has not been damaged during handling.

The parts listed in Figure 6 are customer replaceable parts. The item number column has been included to provide a reference throughout the text; it is not to be used when ordering parts. To order parts, use the part number and description.

The quantity-per-tool column indicates the number of each item required for each tool. The recommended spares column indicates the quantity of each in the column required to maintain up to 10 tools for a period of one year under normal circumstances. A complete inventory should be stocked and controlled to prevent lost time when replacement of parts is necessary.

Additional tools or replacement parts can be ordered through your Tyco Electronics Representative, or call 1-800-526-5142, or send a facsimile of your purchase order to 1-717-986-7605, or write to:

CUSTOMER SERVICE (038-035)
TYCO ELECTRONICS CORPORATION
PO BOX 3608
HARRISBURG PA 17105-3608

Tools may also be returned for evaluation and repair. For tool repair service, contact a Tyco Electronics Representative at 1-800-526-5136.

8. DAILY MAINTENANCE

Each operator of the tool should be made aware of - and responsible for - the following steps of daily maintenance.

1. Clean the tool with a soft-bristle brush and/or soft, clean cloth. Do NOT use any type of solvent to clean the tool.

2. Lubricate pivot points in the center of the tool with a few drops of light machine oil. Apply a thin coat of LUBRIPLATE{, material or equivalent, to sides of the insert. Do NOT lubricate excessively.

3. Frequently inspect tool for wear or other damage. If required, replace parts in accordance with the information provided in Paragraph 9, REPLACING WORN OR DAMAGED PARTS.

4. When NOT in use, store the tool in a clean, dry area with a connector in the connector support, and the tool handles in the closed position.

9. REPLACING WORN OR DAMAGED PARTS

This section covers parts replacement of those recommended spares listed in the parts list which require detailed procedures for removal, installation, and alignment. Refer to Figure 6 and other figures referenced throughout this instruction sheet for assistance.

NOTE

During parts replacement, use SCREWLOCK‡ SEALANT (Part No. 23419-4) or equivalent, on all screw retention threads.

‡ Trademark of Locktite Corporation, Newington, CT

9.1. Cable Clamp (Using Old Style)

Follow these steps if tool has metal cable clamp:

1. Fully open the tool.

2. .Drive slotted spring pin back far enough to remove the old cable clamp.

3. Position new cable clamp and drive slotted spring pin back into place.

9.2. Wire Combs

If misalignment of the wires dictates comb adjustment, proceed as follows:

1. Loosen the screws securing the rear combs. Raise the wire comb support to the vertical position.

2. While looking into the side of the tool, align the comb with the shear plate and tighten the rear comb screws.

3. Loosen screws securing the front combs and align front combs with rear combs. Then tighten screws securing front combs.

9.3. Shear Plates

Never attempt to re-face the shear plates. This will destroy the flatness required for shearing all the wires.

Proceed as follows:

1. With tool handles and wire comb supports fully opened, remove the two screws attaching the shear plate to the connector support.

2. Position new shear plate on connector support against the stop and tighten the two screws.

3. With connector support open, push down and back on shear plate to seat it on shoulder of connector support. Hold shear plate in position and tighten the two screws.

4. If opposite shear plate is to be replaced, repeat this procedure. Refer to Paragraph 10 for tool adjustment.

9.4. Wire Stuffers

The wire stuffers are part of the Inserter Assembly and can be ordered separately. See Parts List, Figure 6; refer to Figure 4 for location of the wire stuffers.

The procedure herein applies to both sides of the tool. It is NOT necessary to remove inserters from the tool. Proceed as follows:

1. With tool handles opened and wire comb supports latched in vertical position, support inserter on a flat surface and, using a drift punch, remove the two inserter pins securing the wire stuffer.

2. Remove wire stuffer from inserter.

3. Position new wire stuffer (Parts List, Figure 6) into inserter and align the holes.

4. Again, support inserter on solid, flat surface. Then, insert two new inserter pins (Parts List, Figure 6).

5. Unlatch wire comb supports, lower connector support and insert connector into connector support until it bottoms. Tighten thumbscrew. Raise connector support and wire combs support to the vertical position. Secure with locking latch

6. Operate the respective tool handle several times to assure proper alignment of wire stuffer with contacts. If alignment is incorrect, adjust the inserter as described in Paragraph 9.5.

9.5. Inserters

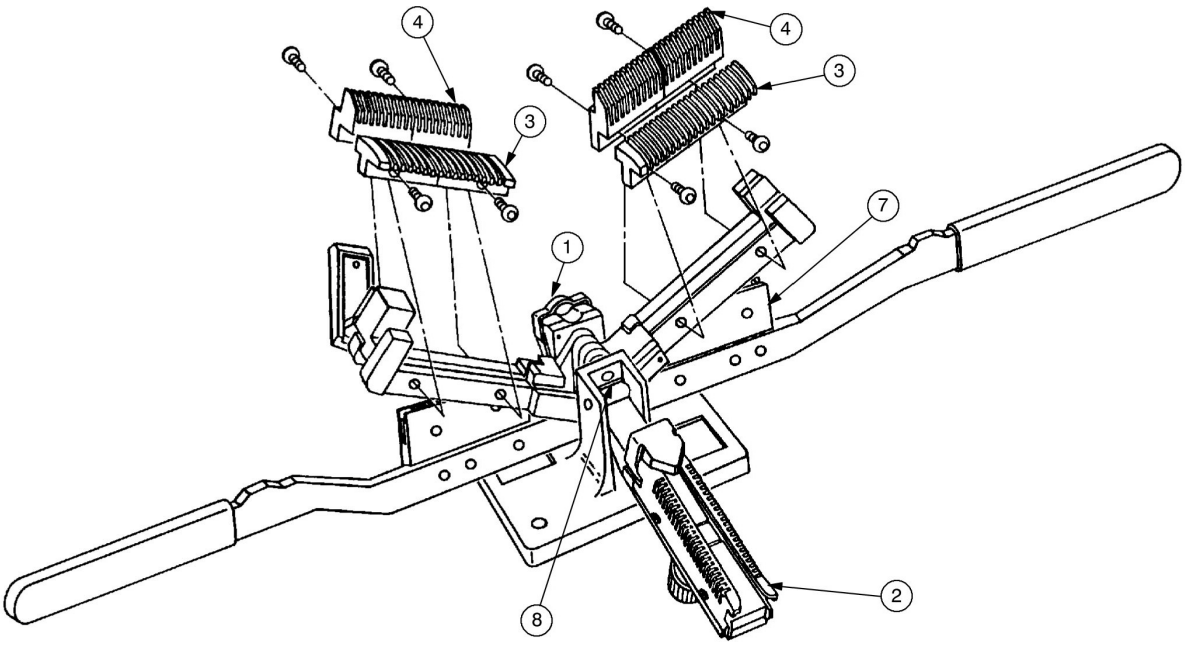
The wire inserters are part of the Inserter Assembly and can be ordered separately. See Parts List, Figure 6; refer to Figure 4 for the location of the wire inserters. The procedure herein applies to both sides of the tool. Note that it may NOT be necessary to replace both inserters. If the replacement of both is required on a single tool, do NOT remove both at the same time.

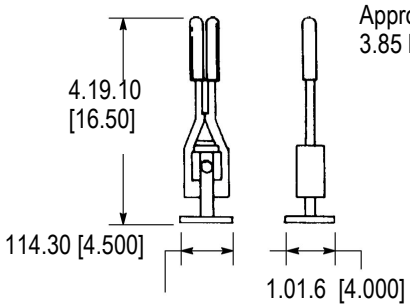
A. Inserter Replacement

1. With tool fully opened, remove the two screws and two flat washers used to secure the inserter assembly to handle. Remove the inserter assembly.

2. If inserter is being replaced with a new one (Parts List, Figure 6), check wire stuffer for damage. If wire stuffers are not damaged, remove them and place them in the new inserters, as described in Paragraph 9.4. The same procedure applies if a new wire stuffer must be installed. ALWAYS use new inserter pins.

3. Position inserter on handle against locating block. Push the inserter down against the locating block (Figure 7) and back against the handle. Tighten the two screws. The inserter is now aligned.





Approximate weight with Carrying Case
3.85 kg [8 lb. 5 oz.]

REPLACEMENT PARTS				
ITEM	PART NUMBER	DESCRIPTION	QTY PER TOOL	RECOMMENDED SPARES
1	229622-1	CLAMP, Cable	1	2
2	231873-1	PLATE, Shear	2	2
3	229399-2	COMB, Front	2	2
4	229406-2	COMB, Rear	2	2
7	231879-1	ASSEMBLY, Inserter	2	2
--	2318678-1•	INSERTER, Standard	2	2
--	230037-1•	STUFFER, Standard	2	2
--	229405-1•	PIN, Inserter	4	4
8	229403-1	SPRING, Lock	1	0

• Part of inserter assembly but can be ordered separately

Figure 6

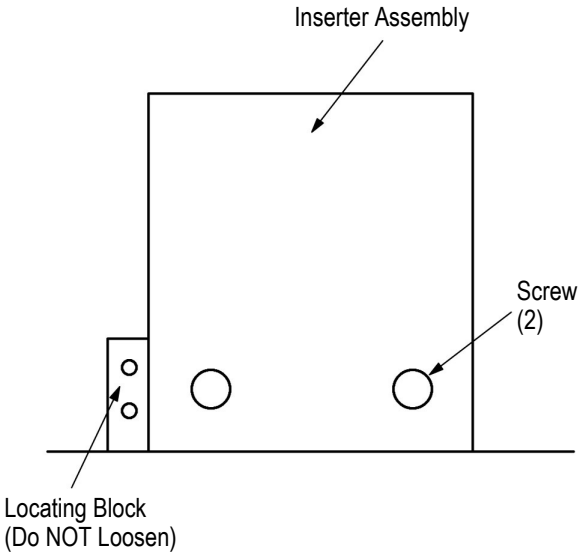


Figure 7

B. Inserter Alignment (If Locating Block is Loose or Missing)

1. Raise connector support to vertical position and insert connector into the connector support until it bottoms. Tighten thumbscrew. Raise wire comb supports to the vertical position. Secure with locking latch.

2. Loosen the screws that secure the back-up plates approximately one turn (see Figure 8).

3. Using caution, raise tool handle until new inserter begins to enter the connector. Then, move inserter up or down to align wire stuffer with contacts. When certain that the wire stuffers have aligned with the contacts, close tool handles fully and tighten screws.

4. If opposite wire inserter is to be replaced, repeat replacement and alignment procedures.

10. TOOL ADJUSTMENT FOR PROPER WIRE CUTTING

Proceed as follows:

1. Raise the connector support and then the wire comb supports to the vertical position. Secure with locking latch.

2. Slowly raise the handles - if inserter binds or has excessive drag - STOP. Re-open handles and adjust backup plate as stated in Step 3. Do NOT force handles closed.

3. Lower handles. Grip connector support and wire comb support with one hand and release locking latch. Now, loosen TOP screw and setscrew, and BOTTOM screw and setscrew securing backup plate to wire comb support. See Figure 8.

4. Move inserter (handle) in and out of shear plate and, simultaneously, squeeze the backup plate until a slight, even drag is apparent - then hold the backup plate in position and tighten TOP and BOTTOM setscrews until slight outward pressure is detected. Release pressure on the backup plate and secure TOP and BOTTOM screws.

5. Again, check for slight drag on inserter. If drag is not even, alternately adjust both the TOP and BOTTOM screws, and setscrews, until proper adjustment is obtained.

6. Repeat this procedure for opposite side, if necessary.

7. Terminate several connectors and inspect the terminations.

The tool is ready for use when each termination meets the requirements specified in Paragraph 6, INSPECTION OF TERMINATIONS.

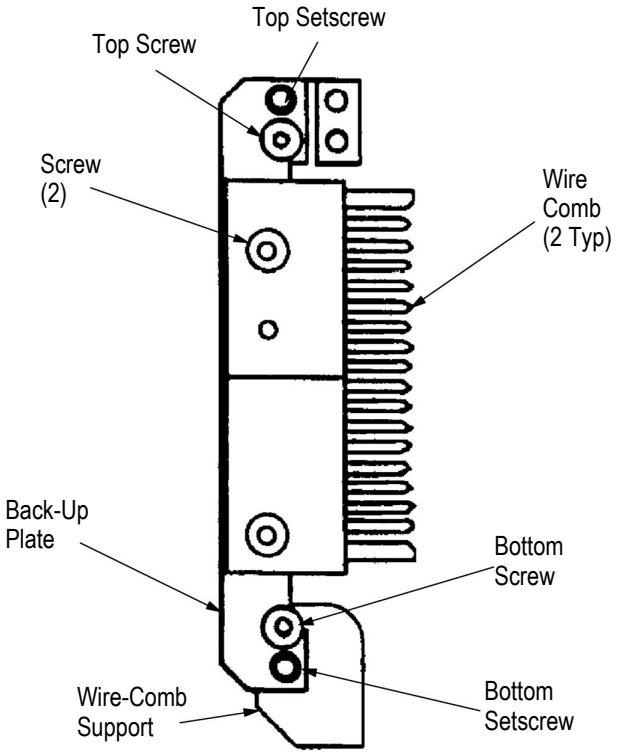


Figure 8

11. TROUBLESHOOTING (FIgure 9)

Use Figure 9 to assist in isolating troubles. The figure lists the troubles, the possible cause, and the remedy for correcting the situation.

TROUBLESHOOTING

TROUBLE	POSSIBLE CAUSE	REMEDY
Crushing Contacts	Inserter Misalignment	Refer to Section 9.5
	Combs Misalignment	Refer to Section 9.2
	Wire Size Not Within Tolerance	Refer to Section 4 for Specification
	Connector Not Properly Seated on Connector Holder	Make Sure Connector is Bottomed Against the Stop; Be Sure Thumbscrew is Tightened.
Cutting Improperly	Tool Not Properly Adjusted	Refer to Section 9
	Inserter Cutting edge Damaged	Replace Inserters (See Section 9.5)
	Tool Not Properly Cleaned	Clean the Tool as described in Section 8
Wires Not Held in Combs	Wire Insulation Diameter Too Small	For insulation less than 0.89 [.035 in.] in Diameter, use (two) small Wire Combs P/N 231619-3. See Section 9.2.

Figure 9

12. CONVERTING TOOLS

Although tool 231880-1 is designed to terminate 64-position connectors and can terminate 14-, 24-, and 36-position connectors without modification or conversion, it can be converted to terminate 50-position connectors by using two inserter assemblies, no. 229694-7. Once converted, it will terminate 14- through 50-position connectors.

To convert the tool for terminating 50-position connectors, proceed as follows:

1. Remove the two inserter assemblies that have been previously installed on the tool. Refer to the Parts List, Figure 6.

2. Replace the inserter assemblies with inserter assemblies for 50-position connectors, part no. 229694-7. Make sure the inserter assemblies are butted firmly against the handles and the locating blocks. See Inserter Replacement procedure, Subparagraph 9.5).

NOTE

Do NOT disturb the setting of the locating blocks. Their positions are pre-set during the final assembly of the tool.

Upon completion of the above procedure, the tool is capable of terminating 14- through 50-position connectors.

13. REVISION SUMMARY

Since the previous release of this instruction sheet, the TE logo has been applied.